

REMARKS

Claims 3, 4, and 6 have been canceled. Claims 1, 2, 5, and 7 have been amended. Claims 1, 2, 5, and 7 remain in the application. A marked up copy of the amended claims is attached hereto as Appendix A.

W/D
Claim 3 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Claim 3 has been canceled and the rejection as to this claim is now moot.

Claim 1, 2, and 5 through 7 were rejected under 35 U.S.C. § 102(b) as being anticipated by Longo et al. (U.S. Patent No. 3,723,165). Applicants respectfully traverse this rejection.

U.S. Patent No. 3,723,165 to Longo et al. discloses a mixed metal and high-temperature plastic flame spray powder and method of flame spraying same. A high temperature plastic powder is flame sprayed in admixture with about 5 – 99 weight percent, and preferably about 40 – 80 weight percent, of a flame spray metal powder by heating the mixture to a temperature sufficient to substantially melt the metal powder and surface heat-soften the high temperature plastic, and propelling the thus heated particles onto a surface, forming a coating. Examples of these high temperature plastics include the well known polyimide plastics, polyamide-polyimide plastics, the polyester imide plastics and the aromatic polyester plastics. Typical metal powders for mixing with the plastic are aluminum alloys, nickel alloys, copper, bronze, babbitt and stainless steels. Longo et al. (does not disclose an article substrate, an inner layer formed on the article substrate of a metal material having a first predetermined thickness, and an outer layer formed on the inner layer of a composite made of a polymer and the metal material having a second predetermined thickness.

In contradistinction, claim 1, as amended, clarifies the invention claimed as a thermally sprayed article including an article substrate and an inner layer of a metal material formed on the article substrate having a first predetermined thickness. The thermally sprayed article also includes an outer layer formed on the inner layer of a composite made of a polymer and the metal material having a second predetermined thickness. Claim 2 has been amended similar to claim 1 and includes the feature of the second predetermined thickness being less than the first predetermined thickness. Claim 5 has been amended similar to claim 1 and includes the feature of the polymer and metal material being co-deposited to form the outer layer having a hardness less than the inner layer. Claim 7 has been amended similar to claim 1 and includes the features of claim 2 and claim 5.

A rejection grounded on anticipation under 35 U.S.C. § 102 is proper only where the subject matter claimed is identically disclosed or described in a reference. In other words, anticipation requires the presence of a single prior art reference which discloses each and every element of the claimed invention arranged as in the claim. In re Arkley, 455 F.2d 586, 172 USPQ 524 (CCPA 1972); Kalman v. Kimberly-Clark Corp., 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983); Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co., 730 F.2d 1452, 221 USPQ 481 (Fed. Cir. 1984).

Longo et al. '165 does not disclose or anticipate the claimed invention of claims 1, 2, 5, and 7. Specifically, Longo et al. '165 merely discloses a mixed metal and high-temperature plastic flame spray powder and method of flame spraying. Longo et al. '165 lacks an article substrate, an inner layer formed on the article substrate of a metal material having a first predetermined thickness, and an outer layer formed on the inner layer of a composite made of a polymer and the metal material having a second predetermined thickness. In Longo et al. '165, the spraying may be effected on any surface or substrate and sprays a bond coat on the surface to

adhere the admixture, but does not thermally spray a metal material against an article substrate to form an inner layer before spraying the admixture in which the metal material is the inner layer and the outer layer. Longo et al. '165 also lacks the outer layer having a thickness less than the inner layer and the polymer and metal material being co-deposited to form the outer layer having a hardness less than the inner layer. Longo et al. '165 does not disclose a thermally sprayed article including an article substrate, an inner layer formed on the article substrate of a metal material having a first predetermined thickness, and an outer layer formed on the inner layer of a composite made of a polymer and the metal material having a second predetermined thickness as claimed by Applicants. Therefore, it is respectfully submitted that claims 1, 2, 5, and 7 and the claims dependent therefrom are allowable over the rejection under 35 U.S.C. § 102(b).

Claims 1, 3, 4, and 6 were rejected under 35 U.S.C. § 103 as being unpatentable over Godel (U.S. Patent No. 5,829,405) in view of Japanese 60190497. Applicants respectively traverse this rejection.

U.S. Patent No. 5,829,405 to Godel discloses an engine cylinder liner and method of making the same. A cylinder liner 1 is formed of three superimposed layers provided by thermal spraying. An inner layer 2 of the cylinder liner 1 is a wear and scorch resistant molybdenum layer. To the outer circumferential surface of the molybdenum layer 2, a low-melting point cobalt alloy is applied as an intermediate binder layer 3 while the outer or cover layer 4 of the cylinder liner 1 consists of an aluminum alloy. Godel does not disclose an article substrate, an inner layer formed on the article substrate of a metal material having a first predetermined thickness, and an outer layer formed on an inner layer of a composite made of a polymer and the metal material having a second predetermined thickness.

Japanese 60190497 discloses a coating method with ceramic. The surface of a material to be processed is ground according to the thickness of a coating layer to be formed and

it is roughened by blasting or other method. After an underlayer is preferably formed by thermally spraying composite Ni-Al powder or the like, a composite material consisting of ceramics such as Cr_2O_3 , $\text{Cr}_2\text{O}_3\text{-SiO}_2$, other metallic oxide, TiC, other metallic carbide, ZrB_2 or other metallic boride and a polymer such as polypropylene resin or silicone resin is thermally sprayed with plasma, a flame or the like. The surface of the resulting ceramic layer is treated with a pore sealing agent such as epoxy resin to seal the pores and the coated material is subjected to finish working to prescribed dimensions. Japanese does not appear to disclose an article substrate, an inner layer formed on the article substrate of a metal material having a first predetermined thickness, and an outer layer formed on an inner layer of a composite made of a polymer and the metal material having a second predetermined thickness.)

The United States Court of Appeals for the Federal Circuit (CAFC) has stated in determining the propriety of a rejection under 35 U.S.C. § 103, it is well settled that the obviousness of an invention cannot be established by combining the teachings of the prior art absent some teaching, suggestion or incentive supporting the combination. See In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 227 U.S.P.Q. 657 (Fed. Cir. 1985); ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 221 U.S.P.Q. 929 (Fed. Cir. 1984). The law followed by our court of review and the Board of Patent Appeals and Interferences is that “[a] prima facie case of obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art.” In re Rinehart, 531 F.2d 1048, 1051, 189 U.S.P.Q. 143, 147 (C.C.P.A. 1976). See also In re Lalu, 747 F.2d 703, 705, 223 U.S.P.Q. 1257, 1258 (Fed. Cir. 1984) (“In determining whether a case of prima facie obviousness exists, it is necessary to ascertain whether the prior art teachings would appear to be

sufficient to one of ordinary skill in the art to suggest making the claimed substitution or other modification.”)

The references cited, either alone or in combination with each other, do not teach or suggest the claimed invention of claim 1. Specifically, Godel ‘405 merely discloses an engine cylinder liner and method of making the same in which a cylinder liner is formed of three superimposed layers provided by thermal spraying including an inner layer of a wear and scorch resistant molybdenum layer, an intermediate binder layer, and an outer layer of an aluminum alloy. Godel ‘405 lacks an article substrate, an inner layer formed on the article substrate of a metal material having a first predetermined thickness, and an outer layer formed on an inner layer of a composite made of a polymer and the metal material having a second predetermined thickness. Japanese ‘497 merely discloses a coating method with ceramic in which an underlayer is preferably formed by thermally spraying composite Ni-Al powder or the like and a composite material consisting of ceramics such as Cr_2O_3 , $\text{Cr}_2\text{O}_3\text{-SiO}_2$, other metallic oxide, TiC, other metallic carbide, ZrB_2 or other metallic boride and a polymer such as polypropylene resin or silicone resin is thermally sprayed with plasma, a flame or the like. Japanese ‘497 lacks an article substrate, an inner layer formed on the article substrate of a metal material having a first predetermined thickness, and an outer layer formed on an inner layer of a composite made of a polymer and the metal material having a second predetermined thickness. Since Applicants cannot tell what else Japanese ‘497 discloses, Applicants respectfully request a full translation of Japanese ‘497 from the Examiner. There is no motivation in the art to combine Godel ‘405 and Japanese ‘497 together.

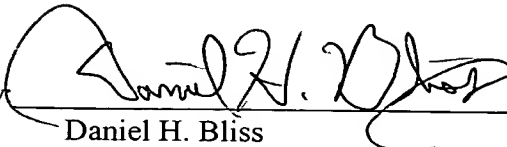
The references, if combinable, fail to teach or suggest the combination of a thermally sprayed article including an article substrate, an inner layer formed on the article substrate of a metal material having a first predetermined thickness, and an outer layer formed on

the inner layer of a composite made of a polymer and the metal material having a second predetermined thickness as claimed by Applicants. The claimed combination is novel and unobvious it improves the machinability of thermally sprayed articles by modifying the outer layer to be machined by decreasing the hardness and increasing the plasticity and lubricity of the outer layer while the hardness of the inner layer remains unchanged. Therefore, it is respectfully submitted that claim 1 and the claims dependent therefrom are allowable over the rejection under 35 U.S.C. § 103.

Obviousness under § 103 is a legal conclusion based on factual evidence (In re Fine, 837 F.2d 1071, 1073, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988), and the subjective opinion of the Examiner as to what is or is not obvious, without evidence in support thereof, does not suffice. Since the Examiner has not provided a sufficient factual basis, which is supportive of his/her position (see In re Warner, 379 F.2d 1011, 1017, 154 U.S.P.Q. 173, 178 (C.C.P.A. 1967), cert. denied, 389 U.S. 1057 (1968)), the rejection of claim 1 is improper. Therefore, it is respectfully submitted that claim 1 is allowable over the rejection under 35 U.S.C. § 103.

Based on the above, it is respectfully submitted that the claims are in a condition for allowance, which allowance is solicited.

Respectfully submitted,

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APPENDIX A**VERSION OF THE CLAIMS WITH MARKINGS TO SHOW THE CHANGES**

Please amend claims 1, 2, 5, and 7 as follows:

1. (AMENDED) A thermally sprayed article comprising:

an article substrate;

an inner layer formed on said article substrate of a metal material having a first predetermined thickness; and

an outer layer formed on said inner layer of a composite made of a polymer and the metal material having a second predetermined thickness.

2. (AMENDED) A thermally sprayed article [as set forth in claim 1]

comprising:

an article substrate;

an inner layer formed on said article substrate of a metal material having a first predetermined thickness; and

an outer layer formed on said inner layer of a composite made of a polymer and the metal material having a second predetermined thickness, wherein said second predetermined thickness is less than said first predetermined thickness.

5. (AMENDED) A thermally sprayed article [as set forth in claim 1]

comprising:

an article substrate;

an inner layer formed on said article substrate of a metal material; and

an outer layer formed on said inner layer of a composite made of a polymer and the metal material co-deposited to form said outer layer, wherein said outer layer has a hardness less than said inner layer.

7. (AMENDED) A thermally sprayed article comprising:

an article substrate;

an inner layer formed on said article substrate of a metal material having a first predetermined thickness; and

an outer layer formed on said inner layer of a composite made of a polymer and the metal material co-deposited to form said outer layer and having a second predetermined thickness less than said first predetermined thickness, said outer layer having a hardness less than said inner layer.